

**WHAT IS CLAIMED IS**

1. The invention herein is a structure for using ATA Side-Band protocol for time-division multiplexing of a single ATA bus with multiple concurrent hard disks , which includes:

5 A primary ATA bus arbiter: It combines the bus requests of ATA bus masters to complete time-division multiplexing on the host side, and

Several ATA/HD bridges, herein they are used to respond to the on-line requests of the bus masters by switching the time-division multiplexing on the target side, thereof at the same time, in order to resolve the possible bus contention that may be generated when two or more ATA drives are acting simultaneously under such time-division multiplexing condition, the ATA/HD bridges shall decide the connection on/off through bridge time line, said the connection on/off between the target drive and the main ATA bus can be controlled, and .

15 Several concurrent ATA master drives: Under such bridge structure, all ATA drives are defaulted as concurrent ATA master drives so that they are independent to each other and can carry out respective commands and await requests from the main system individually, wherein

By means of the foregoing structure, a bridge ATA bus system is constructed to overlap the seek time and data transfer time, improve the storage system's performance and reduce the cable quantity.

2. According to Claim 1 hereof, the bridge uses a non-ATA defined standard signal time line to monitor the bus system.

3. The invention herein includes:

- a. Host proposes ATA bus request, and
- b. Determine whether ATA bus has allowed the request. If not, host shall continue propose ATA bus request, and
- c. Host sends bridge selection signals out, and
- d. Host carries out device selection protocol.

4. According to Claim 3 hereof, which shall also include the read/setup procedure of an external control register generated during software reset,

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